

CLAIMS

What is claimed is:

1. An apparatus for medical imaging or manufacturing process control using multiple wavelength detection, said apparatus comprising:
 - 5 a light source operable to produce light at different wavelengths, said light directed at a sample under test; and
 - 10 an imager operable for detecting light from said sample under test, said imager comprising a plurality of first regions, said plurality of first regions comprising a filter material for detecting light that comprises light at a first wavelength while blocking light that comprises light at a second wavelength, said imager further comprising a plurality of second regions, said plurality of second regions comprising a filter material for detecting light comprising light at said second wavelength, wherein each of said plurality of first and second
 - 15 regions corresponds to a respective pixel of said imager and wherein said first regions and said second regions are interleaved in a pattern.
2. The apparatus of Claim 1 wherein said second regions comprise a filter material for blocking light that comprises light at said first wavelength.
- 20 3. The apparatus of Claim 1 wherein said pattern comprises a regular pattern of said first and second regions.
4. The apparatus of Claim 1 wherein en-face images are output using en-face image data corresponding to said first wavelength and en-face image data corresponding to said second wavelength.
- 25 5. The apparatus of Claim 4 wherein said en-face image data corresponding to said first wavelength and said en-face image data corresponding to said second wavelength are differenced.
- 30 6. The apparatus of Claim 1 wherein gain factors are selectively applied to said first and second regions.
- 35 7. The apparatus of Claim 1 further comprising a filter for blocking light having a wavelength other than said first and second wavelengths.
8. The apparatus of Claim 7 further comprising a filter for blocking subharmonics of said first and second wavelengths.

9. The apparatus of Claim 1 wherein said light source comprises a source of white light and a diffuser.

5 10. The apparatus of Claim 1 used for optical coherence tomography.

11. An apparatus for en-face imaging using multiple wavelengths, said apparatus comprising:

10 an interferometer adapted for en-face image capturing of a sample under test using light having multiple wavelengths including a first wavelength and a second wavelength;

15 a first element optically coupled to said interferometer, said first element operable for receiving light reflected from said sample under test and for detecting reflected light comprising light of said first wavelength; and

a second element optically coupled to said interferometer, said second element operable for receiving light reflected from said sample under test and for detecting reflected light comprising light of said second wavelength;

20 wherein en-face images are output using en-face image data corresponding to said first wavelength and en-face image data corresponding to said second wavelength.

12. The apparatus of Claim 11 wherein said first element comprises a filter material for blocking light of said second wavelength.

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13. The apparatus of Claim 12 wherein said second element comprises a filter material for blocking light of said first wavelength.

14. The apparatus of Claim 11 wherein said first element and said 30 second element are interleaved with additional first and second elements in a single imager, wherein said first element and said second element correspond to respective pixels of said imager.

15. The apparatus of Claim 11 wherein said first element is part of a 35 first imager and wherein said second element is part of a second imager, said apparatus further comprising:

a beam splitter operable for directing light reflected from said sample under test to said first and second imagers;

a first filter disposed between said beam splitter and said first imager, said first filter operable for filtering out light of said second wavelength; and

a second filter disposed between said beam splitter and said second imager, said second filter operable for filtering out light of said first

5 wavelength.

16. The apparatus of Claim 11 wherein said first element is part of a first imager and wherein said second element is part of a second imager, said apparatus further comprising a dichroic beam splitter that receives light reflected from said sample under test, said dichroic beam splitter adapted to direct light of said first wavelength to said first imager and to pass light of said second wavelength to said second imager.

17. The apparatus of Claim 11 further comprising a filter for blocking light comprising a wavelength other than said first and second wavelengths.

18. The apparatus of Claim 11 wherein said en-face image data corresponding to said first wavelength and said en-face image data corresponding to said second wavelength are differenced.

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19. The apparatus of Claim 11 wherein said interferometer comprises an optical fiber bundle.

20. A method for en-face imaging using multiple wavelengths, said method comprising:

capturing en-face images of a sample under test using light having multiple wavelengths including a first wavelength and a second wavelength;

receiving light reflected from said sample under test and distinguishing between reflected light corresponding to said first wavelength and reflected

30 light corresponding to said second wavelength; and

outputting en-face images using en-face image data corresponding to said first wavelength and en-face image data corresponding to said second wavelength.

35 21. The method of Claim 20 wherein said light reflected from said sample under test is received and distinguished using an imager comprising interleaved first regions and second regions, said first regions for detecting light of said first wavelength and said second regions for detecting light of said second wavelength.

22. The method of Claim 21 further comprising:
applying gain factors to selected first regions and selected second
regions.

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23. The method of Claim 20 further comprising:
directing light reflected from said sample under test to a first imager and
a second imager, said first imager for receiving light at said first wavelength
reflected from said sample under test, and said second imager for receiving
10 light at said second wavelength reflected from said sample under test;
blocking light of said second wavelength before it reaches said first
imager; and
blocking light of said first wavelength before it reaches said second
imager.

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24. The method of Claim 20 further comprising:
determining a difference between said en-face image data
corresponding to said first wavelength and said en-face image data
corresponding to said second wavelength.

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25. The method of Claim 20 further comprising:
blocking light having a wavelength other than said first and second
wavelengths.